

## REMARKS

Claims 1 to 4, 6 to 14, 19 to 23, 28 to 33, 37 to 43 and 45 to 49 are pending. Claims 45 and 46 are cancelled.

No claims are allowed.

1. Claims 37 and 47 are objected to because of various informalities. The Applicant has amended the claims to clear up the informalities noted by the Examiner.

Reconsideration of this objection is requested.

2. Claims 43 and 45 are objected to as being of improper dependent form for failing to further limit the subject matter of a previous claim. The Applicant believes that instead of claim 43, the Examiner intended to refer to claim 45. In that respect, claims 45 and 46 have been cancelled, thereby rendering this objection moot with respect to them.

Reconsideration of this objection is requested.

3. Claim 48 is rejected under 35 U.S.C. 112, first paragraph. This claim has been amended to clear up the ambiguous language regarding the overlapping holes having centers offset from the longitudinal axis of the bone plate.

Reconsideration of this rejection is requested.

4. Claims 1, 2, 6, 7, 10 to 12, 19 to 21, 28, 29, 32, 43, 45, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo (U.S. Patent No. 6,406,478) in view of Trebing et al. (U.S. Patent No. 5,601,553) and Talos et al. (U.S. Patent No. 5,709,686).

Kuo describes bone reinforcement plates having holes 21 and slots 22. Both the holes and slots compromise a beveled upper

portion leading inwardly and downwardly through the plate thickness to a lower portion. This is best shown in Figs. 3 and 6 where screws 30 are received in a hole 21 and in a slot 22. The screw has a frusto-conical head supported on a threaded shaft. The frusto-conical head matches the shape of the beveled upper portions of the hole and the slot to provide a wide area contact there.

In Kuo, the threaded screw shaft is of a lesser diameter than the lower portions of the hole 21 and the slot 22. In fact, Kuo teaches away from a threaded engagement between the screw and the bone plate. That's why his system requires the cover 10 "to be firmly engaged with the base (20) [bone plate] to securely abut the screws (30) to maintain the screw (30) rigidly in position." (For support, see column 2, lines 45 to 49.) So, one skilled in the art having read Kuo would not have provided the lower portions of the hole 21 and slot 22 with a diameter substantially similar to that of the threaded screw shaft. In Kuo's system, the screws don't "lock" with the bone plate, as called out in amended independent claims 1, 47 and 49. Instead, they are prevented from disengaging from the base/bone plate by the cover 10.

Trebing et al. relates to a locking plate and bone screw assembly. As described at column 2, line 66 to column 3, line 2, "[t]he plate is provided with a plurality of threaded screw holes 11-15, five in the example shown in FIGS. 1 and 2, for locking screws. All are chamfered at the upper surface of the plate." Additionally, the plate is provided with two holes 16, 17 for temporary screws. These holes 16 and 17 are elongated "with a camming surface 18 to enable the hole to be used to aid in compressing graft material."

However, the elongated holes 16, 17 in Trebing et al. are unthreaded. In that light, the patent to Trebing et al. doesn't

teach a complex aperture having a "threaded lower portion that is adapted to lock with threads of a corresponding bone screw in one or the other of the overlapping holes." The most that can be said for Trebing et al. is that their patent teaches a bone plate having a plurality of cylindrical holes 11-15, each having a chamfered upper portion and a threaded lower portion for threaded engagement with a screw.

This means that the Kuo and Trebing et al. bone plates are in conflict with each other. As previously discussed, Kuo has no need for threads at the lower portion of his base/bone plate because that would completely negate the need for cover 10. On the other hand, one could take the position that it would be an improvement to Kuo to get rid of the cover by sizing the lower portion of the holes to engage the threaded shaft of a screw as taught by Trebing et al. But, Trebing et al. only teach threading cylindrical holes, not elongated apertures such as their temporary screw holes 16, 17 or Kuo's slots 22.

In fact, the applicant believes that Trebing et al. purposely unthreaded the elongated holes 16, 17 so that the shaft of a screw wouldn't contact or catch the lower portions thereof. That's because the elongated holes 16, 17 are described as accepting "temporary screws" (column 3, line 22). In Trebing et al.'s locking plate system what is needed is contact at the upper compression ramp portions of the holes 16, 17 so that a graft material is maintained under compression while the plate's final position is adjusted along the length of the elongated holes 16, 17 with respect to the "temporary screws". Once properly positioned, the plate is permanently locked to the bone with screws received in the threaded cylindrical holes 11-15.

Thus, the result of Kuo in combination with Trebing et al. is a bone plate having a bevelled slot 21 (Kuo) or elongated hole 16, 17 (Trebing et al.) with an unthreaded lower portion. In

these references, the only apertured structure that is threaded is the cylindrical holes 11-15 of Trebing et al. For that reason, the Examiner has cited Talos et al.

Talos et al. relates to a bone plate comprising "holes 2 designed to be so-called elongated slots". They are described in detail at column 2, lines 35 to 50. "As shown in FIG. 4, the lower part of the hole 2 facing the bone application surface 4 is approximately circular in the direction transverse to the plate and, as shown in FIG. 3, it flares approximately conically in the plate longitudinal direction toward the bone application surface 4. An inside thread is in the circular segment of the hole 2 and, because of design constraints, runs only in the lateral part of the plate over an angular range of about 60° to 179°, preferably about 90° to 150°. As shown in FIG. 5, this partial inside thread is used to receive a bone screw 6 with a thread-head 9. By screwing the outside thread of the thread-head 9 into the corresponding and partial inside thread 3, rigid anchoring of bone screw 6 into the plate is achieved. Such screwed-in bone screw 6 serves as a bracing screw." (Emphasis added.)

Careful inspection of the drawing figures in Talos et al. reveals that the lower portion of their bone plate that is not threaded flares conically downwardly and outwardly. This is clearly shown in FIGs. 3, 6 and 8. While not specifically discussed in the patent, one can surmise that this conically flared structure somehow prevents the unthreaded portion of the plate from interfering with the bone screw as the compression force designated by arrow 10 in FIG. 8 occurs with the plate moving relative to the screw as the screw seats in the inside threads in the circular segment of the hole 2.

In that respect, to conclude that Kuo in view of Trebing et al. and Talos et al. would have lead one skilled in the art to provide both an elongated aperture (complex slot) and then thread

its lower portion is a thought process that completely negates Kuo's cover, Trebing et al.'s camming surface 18 for the unthreaded temporary screw holes and Talos et al.'s outwardly flared unthreaded portion. Nonetheless, such a hypothetical thought process would have lead to first providing Kuo's base/bone plate comprising both unthreaded bevelled holes and unthreaded slots. Then, one skilled in the art would have had to understand that it would not only be beneficial to thread Kuo's bevelled holes 21, which Trebing et al. already teach, but to also thread the bevelled slots 22 to engage the threaded shaft of a screw. That's in the face of both of the Kuo and Trebing et al. references having no need for this structure. Kuo has the cover 10 and Trebing et al. want the screw to thread into bone so that the camming surface 18 of the temporary screw hole 16 illustrated in FIG. 6 can "be used to aid in compressing graft material." (For support, see column 3, lines 21 to 25.)

Finally, adding Talos et al. would result in the beveled hole being elongated, but not entirely threaded in its lower portion. It would be hindsight reasoning and completely unfair to the Applicant to jump to the conclusion that Talos et al.'s hole could be completely threaded. Not only does the Talos et al. prior art fail to show that, but the unthreaded lower portion of the hole 2 is conically flared in an outwardly direction for the specific purpose of avoiding contact with a threaded bone screw there. In contrast, independent claims 1, 47 and 49 each call for the "threaded lower portion having an hourglass shape extending from where the compression ramp ends at the hourglass shape to the bottom side of the bone plate with threaded surfaces of the overlapping holes meeting each other at an overlap forming the hourglass shape . . ."

Accordingly, amended independent claims 1, 47 and 49 are allowable over the cited combination of Kuo in view of Trebing et

al. and Talos et al. Claims 2, 6, 7, 10 to 12, 19 to 21, 28, 29, 32 and 43 are patentable as hinging from an allowable base claim. Claim 45 has been cancelled, thereby rendering this rejection moot with respect to it.

Reconsideration of this rejection is requested.

5. Claims 3, 4, 8, 9, 13, 14, 22, 23, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo in view of Trebing et al. and Talos et al. as applied above and further in view of Orbay (U.S. Patent No. 6,358,250).

Orbay teaches a bone plate with holes that define axes which are oblique relative to each other. Nonetheless, claims 3, 4, 8, 9, 13, 14, 22, 23, 30 and 31 each depend from amended independent claim 1. As discussed in section 4 above, independent claim 1 is allowable over the combination of Kuo in view of Trebing et al. and Talos et al. The inclusion of Orbay does not adversely affect that allowability. Accordingly, these claims are patentable as hinging from an allowable base claim.

Reconsideration of this rejection is requested.

6. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo in view of Trebing et al. and Talos et al. as applied above, and further in view of Cesarone (U.S. Patent No. 5,851,207).

Cesarone relates to a separable surgical drill guide and plate. Nonetheless, claim 33 depends from amended independent claim 1 which, as discussed in section 4 above, is allowable over the combination of Kuo in view of Trebing et al. and Talos et al. Accordingly, claim 33 is patentable as hinging from an allowable base claim.

Reconsideration of this rejection is requested.

7. Claims 37 to 41 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo in view of Trebing et al. and Talos et al., and further in view of Tepic et al. (U.S. Patent No. 5,733,287).

Tepic et al. teaches a bone plate with recesses 13 located on the bottom side to reduce peak stresses. In any event, independent claim 37 is allowable over the combination of Kuo in view of Trebing et al. and Talos et al. This prior art combination with respect to the allowability of amended independent claim 1 has previously been discussed in section 4 above. The addition of Tepic et al.'s teachings does not adversely affect that allowability. Accordingly, claims 38 to 41 are patentable as hinging from an allowable base claim. Claim 46 has been cancelled, thereby rendering this rejection moot with respect to it.

Reconsideration of this rejection is requested.

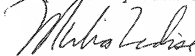
8. Claims 37, 40 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuo in view of Trebing et al and Talos et al., and further in view of Klaue et al. (U.S. Patent No. 5,002,544).

The Klaue et al. patent teaches a bone plate with recesses 10 located on the bottom side thereof. In any event, independent claim 37 has been amended into an allowable form and the addition of Klaue et al.'s teachings does not adversely affect that. Accordingly, claim 40 is patentable as hinging from an allowable base claim. Claim 46 has been cancelled, thereby rendering this rejection moot with respect to it.

Reconsideration of this rejection is requested.

It is believed that claims 1 to 4, 6 to 14, 19 to 23, 28 to 33, 37 to 43 and 47 to 49 are now in condition for allowance. Notice of Allowance is requested.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Michael F. Scalise", is written over the typed name.

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